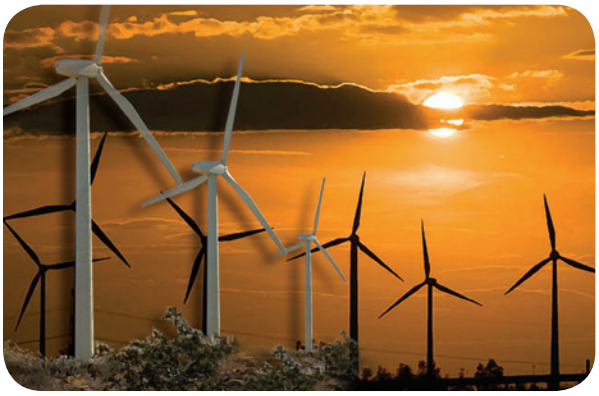
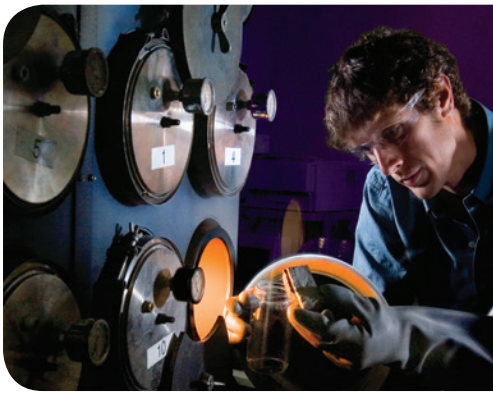
Exceptional service in the national interest

Sandia National Laboratories

Powering the Future

As demand for energy grows worldwide, discovering and harnessing domestic energy sources is increasingly important to national security. Sandia National Laboratories is seeking clean, affordable and reliable energy solutions that will reduce the nation's reliance on foreign oil, lower carbon emissions, secure the nation's electric grid and mitigate the effects of climate change.

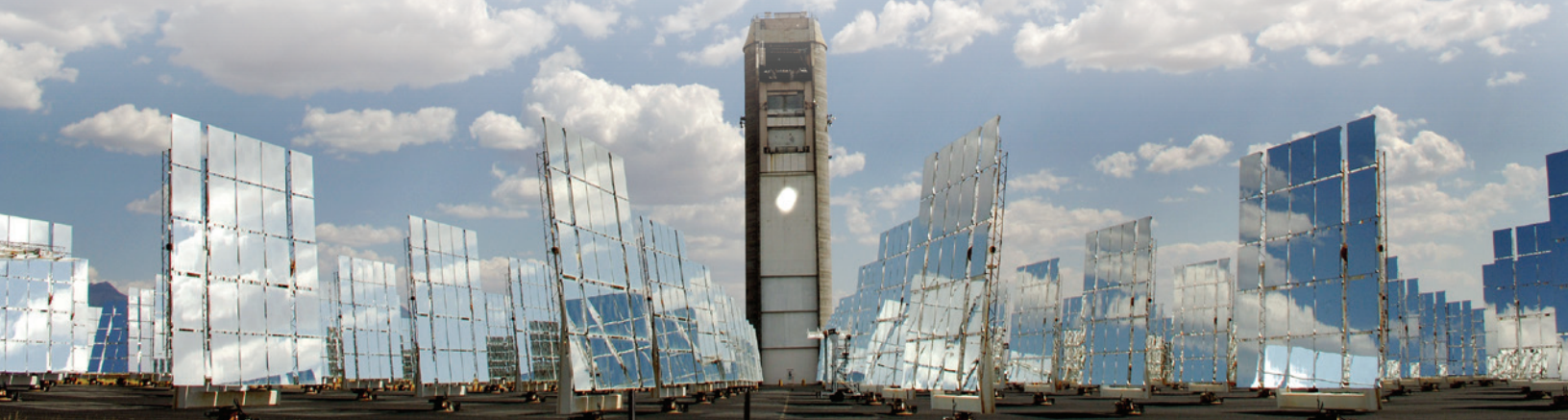




Sandia's rich history in energy research started with the national push for energy independence in the 1970s. Since then, Sandia has led research and development at all levels of energy generation, distribution and storage. Today, Sandia houses innovative programs in geothermal, water, nuclear, biomass and energy storage resources, as well as solar and wind.

The sun, on average, provides enough energy in 90 minutes to meet all the world's energy needs for an entire year, and Sandia is finding new ways to harness that energy, using both photovoltaic solar panels and concentrating solar power, in which mirrors focus the sun's rays onto a receiver. Sandia is conducting applied research to improve wind turbine performance and reliability, while lowering costs. Geothermal energy is a vast U.S. resource, largely untapped due to cost, so Sandia is developing new drilling techniques to reach this power source.

Sandia is working closely with industry to find new and imaginative energy solutions. Sunshine to Petrol uses sunlight to generate synthetic fuels that one day could replace gasoline. Another program harnesses the incredible power of ocean waves, tides and river currents. Sandia's world-renowned Battery Abuse Testing Laboratory tests the safety and reliability of batteries used in the growing electric and plug-in hybrid electric vehicle market. And, the Small Modular Reactor



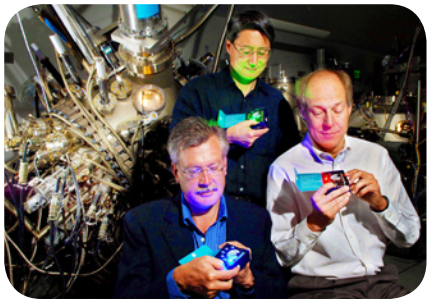
program is developing small-scale nuclear reactors that can be shipped safely to military bases or developing countries to quickly provide electricity without building extensive power lines. These efforts, along with countless others, are paving the way to a cleaner and more affordable energy future.

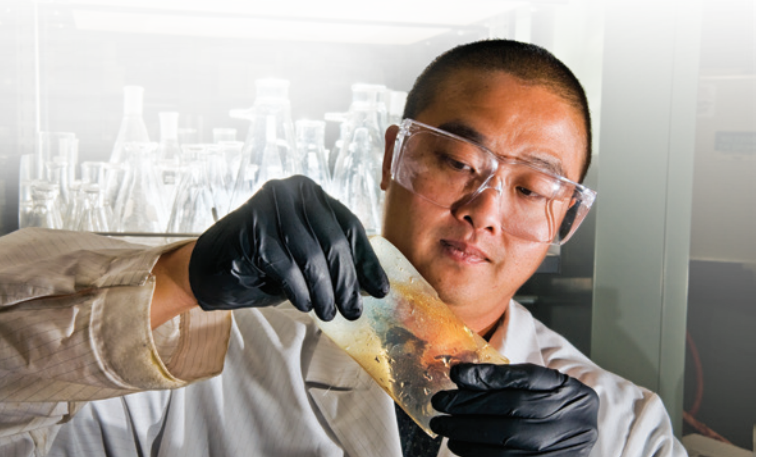
Energy is critical to national security and economic health, but access to water is just as important. The two are inextricably linked: harvesting energy requires abundant water, while water needs readily-available, low-cost energy for treatment and distribution. The nation's ability to provide both faces mounting challenges that Sandia seeks to solve.

Supply variation is another challenge Sandia is addressing. While a coal plant produces a steady source of heat at a nearly constant temperature, solar power can be interrupted by clouds and the wind does not always blow. Incorporating such fluctuating power into the grid, without overloading or starving it, is one key to increased use of renewable energy. Sandia is recognized for its systems expertise, and its scientists and engineers are building on that knowledge to incorporate variable energy sources into the grid. Looking ahead, Sandia researchers are enhancing technologies for energy storage and the SmartGrid. Sandia is also discovering ways to secure the nation's aging, vulnerable and fragile electric grid, while building in resilience in the event of a natural or man-made power disruption.

Technologies developed at Sandia are helping the U.S. emerge as a global leader in the export and deployment of clean, affordable and secure energy solutions while improving the quality of life for people around the world.

To learn more about Sandia's role in energy, climate and infrastructure security work, visit **www.sandia.gov.**





U.S. DEPARTMENT OF ENERGY
NNSA National Nuclear Security Administration

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